

**IMPROVED INFRASTRUCTURAL FACILITIES TO OVERCOME FLOOD  
& DROUGHT IN THRISSUR PONNANI KOLE LANDS UNDER REBUILD  
KERALA INITIATIVE (RKI)**

**PROPOSAL FOR THRISSUR PONNANI KOLE GIS  
MAPPING AND DOCUMENTATION**



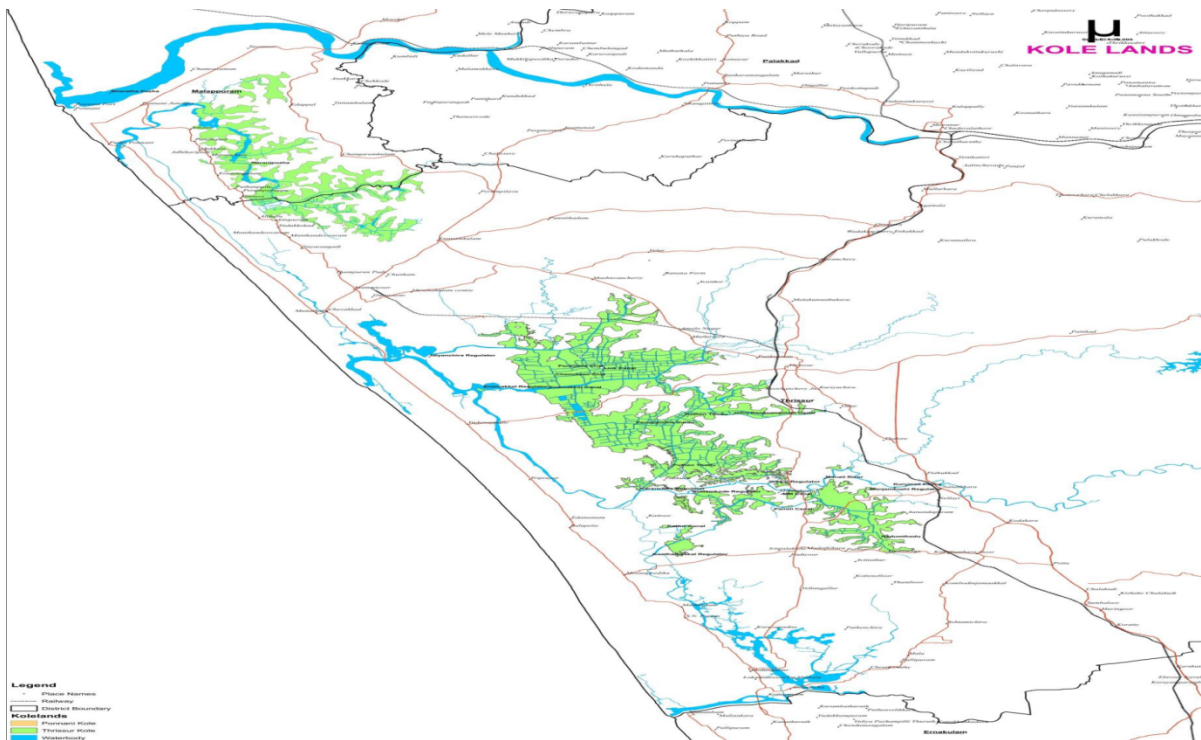
**THE KERALA LAND DEVELOPMENT CORPORATION  
LIMITED  
(An Undertaking of Government of Kerala)**

## 1. Introduction

The Kerala Land Development Corporation (KLDC) Ltd is a state government undertaking, operating under the administrative control of the Agriculture Department. It was established with the objective of promoting, undertaking, and executing land development and related schemes in Kerala to support the comprehensive development of agriculture. The primary goal of KLDC is to develop high-quality infrastructure facilities for the agricultural community in the state. One of the significant projects undertaken by the Corporation is the Thrissur Ponnani Kole Development Project, which aims to develop and enhance paddy cultivation in an area of 13,900 hectares known as the kole area and this project is already completed. Currently as part of the Rebuild Kerala Initiative (RKI), the Corporation is implementing a project known as **"Improved Infrastructural Facilities to Overcome Flood and Drought in Thrissur Ponnani Kole Lands"** in the region. Geographic Information System (GIS) mapping and documentation are essential components of this project.

The Kole land, renowned as one of Kerala's rice granaries, is a distinctive wetland ecosystem located in the Thrissur and Malappuram Districts. It spans an area of approximately 13,900 hectares and serves as a natural drainage system for Thrissur and parts of Malappuram districts through an intricate network of canals. These water bodies connect various sections of the Kole wetlands to rivers such as Karuvannur and Kecheri, eventually leading to the Arabian Sea. Geographically, the Kole land is situated at an elevation ranging from 0.5 to 2.5 meters below mean sea level and is enriched with alluvial deposits brought by the Kechery and Karuvannur rivers. The area is located between latitudes 10°20' and 10°40'N and longitudes 75°58' to 76°11'E, extending from the Chalakudy River in the south to the Bharathappuzha River in the north. In Thrissur District, the Kole land is located in Mukundapuram, Thrissur, and Chavakkad Taluks, while the Ponnani Kole is situated in Ponnani Taluk of Malappuram District.

The entire Kole land area is divided into several blocks, locally known as Padashekarams or Padavu, with each block varying in size from 100 acres to more than 500 acres. Currently, over 165 padashekarams (groups of paddy-growing farmers) are cultivating paddy in the Kole lands. Each padashekaram is equipped with irrigation and drainage canals, petty para systems with pumps, pump houses, submersible pumps with free electricity for the dewatering process. Within the padashekarams, there are irrigation channels as well as drainage systems. Water from the irrigation canals is released into the padashekarams through sluices, and with the aid of submersible pumps or the petty para system, water is pumped out to these canals as needed. Field bunds are constructed within these padashekarams to facilitate the transportation of inputs such as lime, seeds, fertilizers, and paddy. Additionally, ramps are built on the farm bunds to provide access for various farm machinery into the padashekarams.



## **2. Scope of the Project**

The primary objective of the proposal is to establish a comprehensive Web-GIS mapping system (for both web and mobile platforms) and ensure accurate documentation of the project area. The geographical information system (GIS) has to serve as a robust platform for the area's development. It has to facilitate the management of both spatial and non-spatial datasets within the GIS environment. The project adopts a "Whole to Part" approach in terms of data organization and navigation.

The developed applications should be accessible as web services, allowing users to access the mapped resources through any standard web browser and a dedicated mobile application. As part of the project, the field staff of KLDC shall be equipped with interactive tools to identify and update various resources and infrastructures on the spatial database. This will include capturing photographs, videos, longitude, and latitude coordinates of assets, which will contribute to the creation of a shareable repository of data. To accomplish this, suitable tools has to be deployed at the client level to accurately capture infrastructure elements as points, lines, or polygons on the base map.

## **3. Objectives**

Web GIS based Resource Information System for the Thrissur-Ponnani Kole area has to facilitate dissemination of ground level information, monitoring/ decision Support in a single platform for developmental planning at grass root level. Web GIS based application has to facilitate dissemination of geo-spatial data related to padashekharam wise level information (Land Use Land Classification (LULC)/Soil types/ Wetlands/Irrigated and non-irrigated Single crop/double crop/Yield data /Irrigational infrastructural data layers). Integration of online maps services such as Survey of India maps(if possible), Google, Bing etc.. is desired in the project.

Facilitate reporting and updating of the events along with photographs and videos storage facility from the application to the database and display of the same on the portal. The mobile phones can be used for data collection purpose. The application shall be intuitively designed to facilitate an easy to use ergonomic design interface for hassle free operation and information access.

**The Application shall have the following broad features.**

1. User friendly System with logically organized Navigation Controls for easy information accessibility.
2. Integration of different thematic layers and Base Map (High Resolution Satellite Image (if possible), Topographic Maps, Hybrid maps) from Google maps, Bing maps etc.
3. Table of Content (ToC) based organization of Spatial Data Layers, Soil, Wetlands etc.
4. GIS toolbar for Spatial Data Management (Pan, Zoom, Scale, Measurement –Should provide a comparative analysis of map API services provided by Google/Bing (paid/free) Distance/ Area, Identify/ Information Window, Search)
5. Query Builder interface for execution and generation of attribute (geo-spatial queries) on Area of Interest (AoI) along with generation of information on sidebar for each query (e.g. On selection of a particular AoI, an information panel displaying particular assets marked).
6. Generation of Map based reports at the user end
7. Customized Portal views for Administrative users
8. 3D vision of the area

Thrissur-Ponnani kole boundary has to be delineated first. The canal system of the Thrissur Kole area has to be progressively marked with the total length and width of the 32 main canals. The different padasekharams in the Thrissur-Ponnani Kole has to be identified with unique name and ID. The infrastructural assistance in the Kole

land like innerchal deepening, kida, ramp, pumps and transformers has also to be identified. The following are the detailed lists.

#	Item Description	Fields
1	Padasekharam	Unique ID Name of Padasekharam Type of Soil (.....) Crop (Single/Double)
2	Bunds	Length, Breadth (top level), Breadth (bottom level) Height, Area (top level)
3	Deepening of Canals	Name of canal Length (in meter) Breadth (in metr) Approved qty(cum.meter), Executed qty (cum.meter) Benchmark level(meter) Bottom level, Flood level
4	Innerchal deepening	Name of the innerchal Name of Padashekaram Length(meter) Approved qty(cum.meter), Executed qty (cum.meter) Flood level
5	Engine thara	Name or location Name of Padashekaram(s) connected Length(meter) Width (meter)
6	Engine shed	Name Name of Padashekaram(s) connected: Motor type (Submersible/Vertical Axis/Conventional):

7	Ramp	Name Width (meter) Length (meter)Height (meter)
8	Kida	Name Length (meter) Breadth Slope
9	Transformer	Name or location Type of transformer Rating in KVA (number in decimal),
10	Submersible pump	Name Rating
11	Vented Cross Bar (VCB)	Length Breadth Height
12	Sluice	Length Breadth Height
13	Tourism spots	Unique name
As the items are mapped the latitude and longitude needed to be recorded		

**Other fields required while mapping a component**

1. Status of work (Proposed, Ongoing, Completed)
2. Work start date

3. If completed : completion date

### **Specific Requirements (Visual Documentation)**

1. A separate layer for Thrissur Kole Area and another for Ponnani Kole Area in addition to the combined layer of Thrissur-Ponnani Kole is also required (Vector maps of these area is available with KLDC and will be provided to the selected firm).
2. The GIS mapping application is desired to assist for future projects in the area also.
3. The application should able to generate customized reports and charts regarding the interventions with complete details from the mapped assets according to specific queries.
4. Options should be there to upload photographs and videos of work sites to the server
5. 3D visualization

## **4. User Levels and Privileges**

1. The major field level staffs are Assistant Project Engineers. So the mobile application for data collection with individual user login name and password has to be assigned to them.
2. Once the field engineers uploaded the field level data, the Deputy Project Engineers/Project Engineer will verify and approve it before displaying it to public domain.
3. The Managing Director/Chief Engineer who are at the top of the hierarchical list of Corporation should be provided full access to the entire application.



4. The Corporation's System Admin is to be provided with privileges for adding new users/deleting existing users.
5. Separate dash board is desirable to each class of user.

## **5. Scope of services for the proposed project**

1. Pre-processing/Quality checking of data as a collaborative work
2. Layer management
3. Creation and configuration of Spatial Database
4. Design and development of web and mobile applications
5. Design and development of Functions/tools/Queries and Reports
6. Testing of modules/integration level testing/validation etc..
7. Interactive data navigation/visualization/query system
8. Internal Security auditing
9. Capacity building in application development and management of web/mobile applications
10. Provide necessary application and interface support to KLDC.

## **6. Description of Deliverables**

1. All software components used for development
2. All source codes/algorithms/flowcharts etc related to web app
3. Design documents and methods used in the web applications (System design/DFD/Database design/SRS etc..)
4. Capacity building
5. Relevant User manual, development support, analytics tools for access statistics etc.

## **7. Roles and Responsibilities of the selected firm**

1. Processing of data
2. Server configuration-Database server, application server, open source server etc.
3. Design, development and configuration of interactive response system
4. Design and development of Web/Mobile application
5. Interface design- Customization of forms for required apps
6. Design and development of Functions/tools of functions/tools/queries and reports
7. Testing and validations
8. Server hosting and management (at State Data Center)
9. Capacity building in use/management of the application
10. Provide interface for access statistics/analytics reports using Google Analytics tools/equivalent tools.

## **8. Technology Architecture**

State of the art web technology tools and systems conforming to Services Oriented Architecture has to be used in implementing the system. The open standard databases technologies has to be used to integrate future requirements and make the system more flexible. The entire application should be developed by using open source technology tools in accordance with the Govt. IT policy.

## **9. Conclusion**

The ultimate aim of the project is the proper documentation and tagging of assets in the Thrissur Ponnani Kole area and showcase it to presentable form to government and public and also aims in future planning. The entire project has to be completed within six months from the date of agreement.